



## **Leaf Photosynthetic Rates of Mature Holm Oak Trees Growing in Close Proximity to a Natural CO<sub>2</sub> Spring**

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### **Reference**

Paoletti, E., Seufert, G., Della Rocca, G. and Thomsen, H. 2007. Photosynthetic responses to elevated CO<sub>2</sub> and O<sub>3</sub> in *Quercus ilex* leaves at a natural CO<sub>2</sub> spring. *Environmental Pollution* **147**: 516-524.

### **What was done**

The authors measured rates of net photosynthesis during a two-week period in June of 2002 "at the end of the spring rains," when midday air temperatures rose above 40°C, in upper sunlit leaves of mature holm oak (*Quercus ilex* L.) trees growing close to (5 m), and further away from (130 m), a natural CO<sub>2</sub>-emitting spring near Laiatico (Pisa, Italy), where the trees had experienced *lifetime exposure* to atmospheric CO<sub>2</sub> concentrations of approximately 1500 and 400 ppm, respectively.

### **What was learned**

At the midpoint of the 14-day measurement period, the net photosynthetic rates of the leaves on the trees growing closest to the CO<sub>2</sub> spring were approximately 250% greater than those of the leaves on the trees growing 125 meters further away, where the air's CO<sub>2</sub> concentration was 1100 ppm less than it was in the vicinity of the trees nearest the spring.

### **What it means**

In the words of the four Italian researchers who conducted the work, "the considerable photosynthetic stimulation at the very high CO<sub>2</sub> site suggests no photosynthetic down-regulation over long-term CO<sub>2</sub> enrichment." This real-world finding thus demonstrates the truly amazing potential for very large increases in the air's CO<sub>2</sub> content to greatly stimulate photosynthesis and significantly enhance the growth and development of earth's plants over the very-long-term.

Clearly, the *aerial fertilization effect* of atmospheric CO<sub>2</sub> enrichment is not a flash-in-the-pan phenomenon. It is here to stay ... and growing bigger by the day.